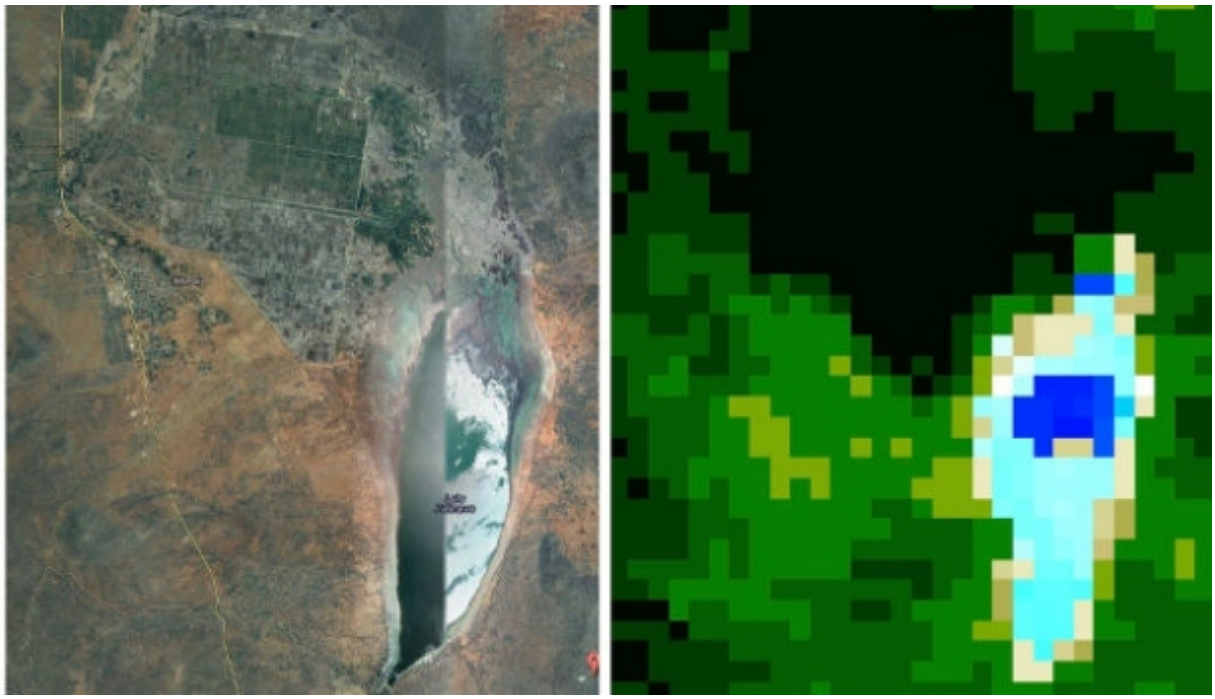
Feed the Future Country Fact Sheet

Online Version: https://feedthefuture.gov/article/satellite-imagery-space-protects-farmers

Satellite Imagery From Space Protects Farmers



Jon Einar Flatnes

An example of satellite imagery, representing a “normalized difference vegetation index” (NDVI) used to track plant growth, crop type and planting cycles.

Just over 100 miles from Mount Kilimanjaro in northern Tanzania, in the villages of Ndungu and Kihurio, researchers from the Feed the Future Innovation Lab for Assets and Market Access, led by the University of California, Davis, are implementing groundbreaking technologies to bring improved financial stability to local farmers.

In developing countries such as Tanzania, index insurance (as opposed to individual indemnity insurance) is offered to help protect farmers against the inherent risks of farming. Index insurance traditionally sets payouts based on estimated crop yields using historic weather data such as annual rainfall. However, a major shortcoming occurs when estimates do not accurately reflect, and payout does not match, the real losses a farmer suffers. This discrepancy is called “basis risk.”

By exploiting improved technology, the Assets and Market Access Innovation Lab is pioneering approaches to help reduce basis risk and grow confidence and opportunity among the farmers in impoverished regions. In Tanzania, enhanced, high-definition satellite imagery is being used to apply sophisticated new methodologies to track plant growth, crop type and planting cycles. This is all being made possible through a public-private collaboration with geo-spatial software engineering firm Vencore.

Through this partnership, Innovation Lab researchers and Vencore analysts successfully transformed nearly a decade of raw satellite data into functional, widely applicable indices. The information gathered though these satellite-based measures is inexpensive, abundant, increasingly precise, and broad enough to allow the analysis of multiple factors such as vegetation health and crop differentiation. The data provided by satellite imagery not only helps create more accurate indices by incorporating precise determinations of crop yields and losses, but it can also be used to delineate micro insurance zones in which farm plots of similar agroecologies can be covered by the appropriate index.

While this enhanced index insurance program is still not a perfect predictor of the tangible agricultural risks facing farmers, it does demonstrate real promise for improving the welfare of agrarian regions through improved index accuracy. With the

addition of a contract clause, which allows farmers to request an on-the-ground audit when the satellite data fail to correctly measure yields, cost-effective and risk-reducing insurance plans can be implemented. This “fail-safe” package encourages insured famers to confidently invest in more productive agricultural practices that ultimately create pathways out of poverty.

This Feed the Future-supported research highlights two important considerations for future projects. First, public-private partnerships can produce cutting-edge methodologies. By reaching out to Vencore to access their unique expertise, Innovation Lab researchers were able to use the algorithms produced from this partnership to implement fruitful innovations, lowering insurance costs and creating better protections for at-risk farmers. Second, thinking outside the box to creatively use available technologies can also improve research outcomes driving growth and production in Feed the Future countries and beyond.